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## New Species of *Erythroneura* (Homoptera: Cicadellidae) \*

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The species described here all belong to the *Eratoneura* subgenus or *maculata* group. In most of them the posterior point on the foot of the style is about as long or longer than the foot and they are related to *gemina* McAtee, *mirifica* Beamer, *arta* Beamer, *penesica* Beamer and *solita* Beamer. The principal diagnostic characters are seen in the lateral and posterior views of the shaft of the aedeagus, the length and shape of the pygofer hook, the shape of the foot of the style, the size of the black spot in the first apical cell, and the host plants. The drawings of the posterior views of the shaft of the aedeagus often show this part slightly tilted ventrally so as to depict the greatest length of the shaft.

Many named and unnamed species were reared in Mississippi and Tennessee during the years 1961 to 1964 and many were taken on host plants on collecting trips from 1961 to 1964. Other specimens were borrowed from the Illinois Natural History Survey and Florida State Plant Board collections.

In the drawings, the aedeagi and styles are double the magnification of the pygofers and pygofer hooks. Unless otherwise stated, all specimens were collected by the author and types will be deposited in the Illinois Natural History Survey collections.

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**Erythroneura douglasi** new species (Fig. 1)

Length 2.6 mm; color pattern of elongate spots and black spot in first apical cell smaller than average. Shaft of aedeagus in lateral view long and narrow, in posterior view with very narrow lateral flanges; dorsal process about half length of shaft. Pygofer hook much longer than pygofer, in lateral view slightly curved and evenly broadened from apex to base; in dorsal view slightly sinuate, gradually broadened on basal half. Foot of style with short anterior point, posterior point curved, much longer than foot.

Holotype ♂, allotype ♀ and 4 ♂ and 7 ♀ paratypes reared at State College, MISSISSIPPI, in cage 496 on *Quercus marilandica*, blackjack oak, collected on 13 July, 1964, and 3 ♂ and 2 ♀ paratypes with the same data except collected on 16 June and 1 Aug., 1964.

This species differs from *gemina* in having a much smaller black spot in first apical cell, a much longer pygofer hook and a more strongly curved posterior point on foot of style. The host plant is evidently blackjack oak.

**Erythroneura nigriquera** new species (Fig. 2)

Length 2.6 mm; color pattern of narrowly connected large spots and with black spots in first apical cell smaller than average. Shaft of aedeagus in lateral view broader on basal half, in posterior view with very narrow lateral flanges; dorsal process more than half length of shaft. Pygofer hook slightly longer than pygofer, in lateral view evenly curved and gradually broadened from apex to base, sculptured on outer half; in dorsal view almost straight, broadened on basal third. Foot of style narrow, posterior point longer than foot, sculptured, curved.

Holotype ♂, allotype ♀ and 3 ♂ and 2 ♀ paratypes, reared on *Quercus nigra*, water oak, at State College, MISSISSIPPI, in cage 283, collected on 4 Aug., 1964 and 7 other pairs of paratypes with same data except collected on 8 July and 11 June, 1964. Additional paratypes consisting of 6 ♂ and 15 ♀ with same data as holotype except reared in cage 402 and collected

24 June, 1964, and 1 ♂, Quincy, Florida, 31 July, 1956, F. W. Mead, on *Quercus nigra*.

This species resembles *gemina* but with a longer pygofer hook and broader aedeagus shaft on basal half. The host plant is evidently *Quercus nigra*.

### **Erythroneura lyriquera** new species (Fig. 3)

Length 2.8 mm; spotted, with black spot in first apical cell larger than average. Shaft of aedeagus in lateral view with narrow, roughened dorsal flange along most of posterior margin, in posterior view with narrow lateral flanges; dorsal process about half length of shaft. Pygofer hook about length of pygofer, narrow and only slightly curved in both views. Foot of style with distinct anterior point and with long, sculptured, sinuate posterior point longer than foot.

Holotype ♂, allotype ♀ and 12 ♂ and 19 ♀ paratypes, reared at State College, MISSISSIPPI, in cage 308 on *Quercus lyrata*, overcup oak, collected 2 July, 1964 and 7 pairs with same data except collected on 28 July and 6 Aug., 1964. Additional paratypes, 30 pairs, with data as above except reared in cages 311 and 312 in July and Aug., 1964.

This species resembles *gemina* but with larger spot in first apical cell, longer, sinuate posterior point on foot of style and roughened dorsal flange along most of posterior margin of shaft of aedeagus. The host plant is evidently *Quercus lyrata*.

### **Erythroneura reedi** new species (Fig. 4)

Length 2.6 mm; spotted, with spot in first apical cell larger than average. Shaft of aedeagus in lateral view short, sinuate on posterior margin, broadest at base, in posterior view with narrow lateral flanges along most of shaft; dorsal process about half length of shaft. Pygofer hook about length of pygofer, almost straight in both views, sculptured on outer third. Foot of style with posterior point somewhat longer than foot, evenly curved for most its length, heel larger than most.

Holotype ♂, allotype ♀ and 15 ♂ and 7 ♀ paratypes reared at State College, MISSISSIPPI, in cage 463 on *Quercus falcata* var. *leucophylla*, cherry bark oak, and collected 19 July and 14 Aug., 1963 and 11 ♂ and 5 ♀ with the same data except reared in cage 266 and collected on 8 July, 1964.

This species differs from *gemina* in having a much shorter aedeagus shaft and from *gemoides* Ross in having shorter pygofer hooks and longer posterior point on foot of style.

#### *Erythroneura nielsoni* new species (Fig. 5)

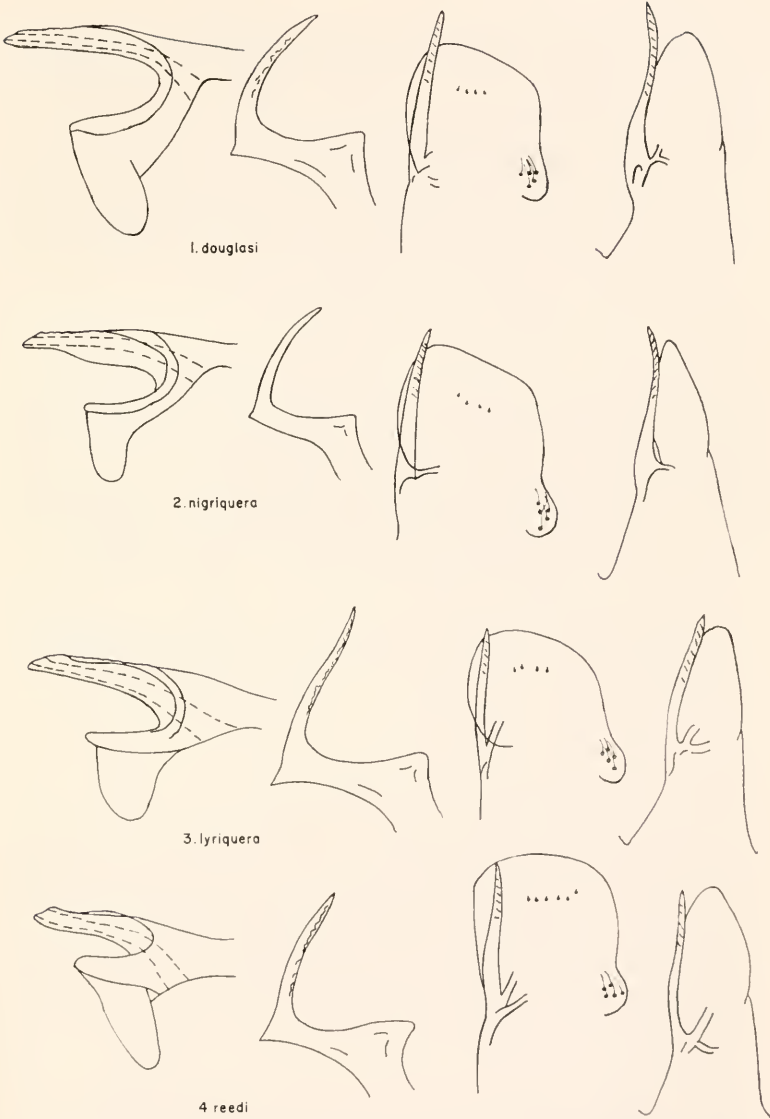
Length 3 mm; color pattern of large elongate spots and black spot in first apical cell larger than average. Shaft of aedeagus in lateral view long, broad and parallel margined, in dorsal view with lateral flanges distinct only at base; dorsal process short, spine-like, with short apodeme almost opposite base of shaft. Pygofer hook barely over half length of pygofer, broad, blade-like and slightly curved in lateral view, sinuate in dorsal view. Foot of style with long, slightly curved posterior point, foot quite narrow before large heel.

Holotype ♂, allotype ♀ and 14 ♂ and 18 ♀ paratypes reared at State College, MISSISSIPPI, in cage 214 on *Quercus lyrata*, overcup oak, collected on 19 Aug., 1964. One additional paratype, Cave-in-Rock, Illinois, 1 Sept., 1963, *Carya ovata*, shag-bark hickory.

This species resembles *mirifica* but with larger black spot in first apical cell and with smaller lateral flanges. The host plant is evidently *Quercus lyrata*.

#### *Erythroneura albiquera* new species (Fig. 6)

Length 3 mm; color pattern of large spots and black spot in first apical cell smaller than average. Shaft of aedeagus in lateral view curved on anterior margin, broadest on basal half, in posterior view with medium lateral flanges; dorsal process about half length of shaft, apodeme subapical. Pygofer hook about length of pygofer, narrow in both views. Foot of style slender with narrow, sinuate posterior point almost twice length of foot and heel very large and broad.



FIGS. 1-4. *Erythroneura* species indicated, left to right: lateral view of aedeagus, foot of style, lateral view of pygofer and pygofer hook and dorsal view of pygofer and pygofer hook. (Aedeagus and foot of style 2× magnification of pygofer and pygofer hook.)

Holotype ♂ and 7 ♂ paratypes, State College, MISSISSIPPI, 17 March, 1962. Additional ♂ paratypes as follows: State College, Mississippi, 1, 25 Jan., 1962, 1, 4 Mar., 1962, 1, 4 April, 1962, 1, 10 April, 1962. *Ilex decidua*; 1, Eupora, Mississippi, 9 July, 1961, *Quercus alba*, white oak.

Somewhat resembles *mirifica* but with longer posterior point on foot of style and longer pygofer hook, and differs from *igella* Ross and DeLong in having a shorter aedeagus shaft with larger lateral flanges. *Q. alba* may well be the host.

### **Erythroneura kirki** new species (Fig. 7)

Length 3 mm; with slender markings and black spot in first apical cell average size. Shaft of aedeagus in lateral view short and broad with a distinct dorsal flange, in posterior view with lateral flanges only on basal half; dorsal process short. Pygofer hook much shorter than pygofer, slender, sinuate in both views. Foot of style with slender posterior point longer than foot.

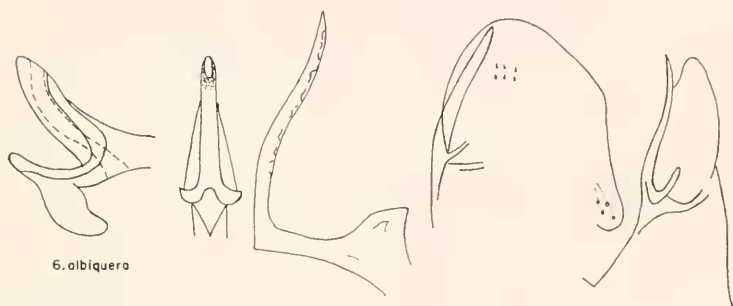
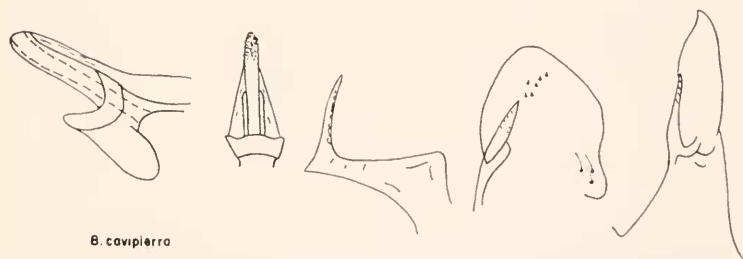
Holotype ♂, State College, MISSISSIPPI, 6 Oct., 1961, *Quercus stellata*, post oak.

Resembles *parva* Beamer, but with broader aedeagus shaft in lateral view and with longer dorsal process on aedeagus. *Q. stellata* may be the host.

### **Erythroneura cavipierra** new species (Fig. 8)

Length 2.8 mm; color pattern of large spots and black spot in first apical cell average size. Shaft of aedeagus in lateral view almost parallel margined, smooth, in posterior view rough on apical half with medium lateral flanges on basal half; dorsal process about one-third length of shaft. Pygofer hook short, almost straight in both views, broadest in lateral view. Foot of style long and slender, posterior point straight, almost as long as foot.

Holotype ♂ and 2 ♂ paratypes, Jefferson, TEXAS, 3 July, 1962, at light, and 2 other ♂ paratypes, same data except collected by Leon W. Hepner, Jr. One other ♂ paratype, Cave-in-Rock, Illinois, 1 Sept., 1963, *Quercus stellata*, post oak.

5. *neilsoni*6. *albuquerquei*7. *kirki*8. *covipierri*

Figs. 5-8. *Erythroneura* species indicated, left to right: lateral view of aedeagus, posterior view of aedeagus, foot of style, lateral view of pygofer and pygofer hook and dorsal view of pygofer and pygofer hook. (Aedeagus and foot of style 2× magnification of pygofer and pygofer hook.)

This species most nearly resembles *abjecta* Beamer but with dorsal process not spine-like, shorter pygofer hook and with narrower lateral flanges.

**Erythroneura stannardi** new species (Fig. 9)

Length 3 mm; color pattern and black spot in first apical cell average size. Shaft of aedeagus in lateral view short and broad with very large dorsal flange, in posterior view spiny and without lateral flanges; dorsal process very short. Pygofer hook in lateral view slightly longer than pygofer, blade-like, broadest on outer half, in dorsal view slightly sinuate, broadest on basal half. Foot of style short, heel large, posterior point much longer than foot.

Holotype ♂, allotype ♀ and one ♀ paratype reared at State College, MISSISSIPPI, in cage 604 and collected on 6 Sept., 1962. The ♀ parent was collected at Houston, Mississippi, on *Q. coccinea*, scarlet oak, and the offspring reared on *Q. palustris*, pin oak. Additional ♂ paratypes as follows: 2, Houston, Mississippi, 15 Oct., 1961, *Quercus coccinea*; 1, Iuka, Mississippi, 5 Aug., 1961, *Quercus rubrum*, northern red oak; 6, Siloam Springs, Brown Co., Illinois, 29 Apr., 1960, Ross and Cunningham; 4, Rushville, Illinois, 29 Apr., 1960, Ross and Cunningham; 2, Thornton, Illinois, 7 Sept., 1949, Ross and Stannard. 1, *Corylus americana* and 1, *Q. ellipsoidea*; 1, Rocky Branch, Illinois, 25 July, 1954, H. B. Cunningham; 1, Rocky Branch, Illinois, 13 May, 1949, Ross, Gloyd and Stannard.

The shaft of the aedeagus most nearly resembles *acantha*, but that species has no posterior point on foot of style. It may well utilize several of the red oaks as hosts.

**Erythroneura rubrarta** new species (Fig. 10)

Length 3 mm; with broad red band across middle of clavus extending through corium to costal plate and a second red band from apex of clavus to costal margin, black spot in first apical cell average size.



Shaft of aedeagus in lateral view long and narrow, apically "beaked," with large, thin dorsal flange, in posterior view with large membranous lateral flanges; dorsal process about half length of shaft. Pygofer hook longer than pygofer, roughened, doubly sinuate in lateral view, in dorsal view curved, broadest on basal half. Foot of style pointed obliquely outward, slender with broad, sculptured posterior point.

Holotype ♂, State College, MISSISSIPPI, 15 March, 1963.

This species most nearly resembles *arta* but with pygofer hook differing in shape and with red bands on wings. The host plant is unknown.

### ***Erythroneura krameri* new species (Fig. 11)**

Length 3 mm; color pattern of broad markings and black spot in first apical cell very large. Shaft of aedeagus in lateral view almost parallel margined, roughened on posterior margin, in posterior view with narrow flanges toothed on apical half; dorsal process very short. Pygofer hook shorter than pygofer, slightly falcate in both views. Foot of style slender with curved posterior points almost length of foot.

Holotype ♂ and 1 ♂ paratype, State College, MISSISSIPPI, 11 Sept., 1963. Additional ♂ paratypes as follows: State College, Mississippi, 2, 29 March, 1963, *Ilex decidua*, 1, 24 May, 1963, *Carya tomentosa*, 1, 21 Aug., 1963, *C. tomentosa*; 1, Murray, Kentucky, 3 Sept., 1963, *Carya tomentosa*; 1, Lexington, Tennessee, 4 Sept., 1963, *Quercus phellos*; 1, Giant City State Park, Illinois, 14 Sept., 1954, Mills and Ross; 1, Cobden, Illinois, 8 Feb., 1957, Ross and Kramer.

This species is near *penesica* but has a thicker shaft of aedeagus with much wider lateral flanges. The host plant is evidently *Carya tomentosa*, mockernut hickory.

### ***Erythroneura pamelae* new species (Fig. 12)**

Length 3 mm; color pattern darkening posteriorly and black spot in first apical cell average size. Shaft of aedeagus in lateral view slender, almost parallel margined with narrow, rough-

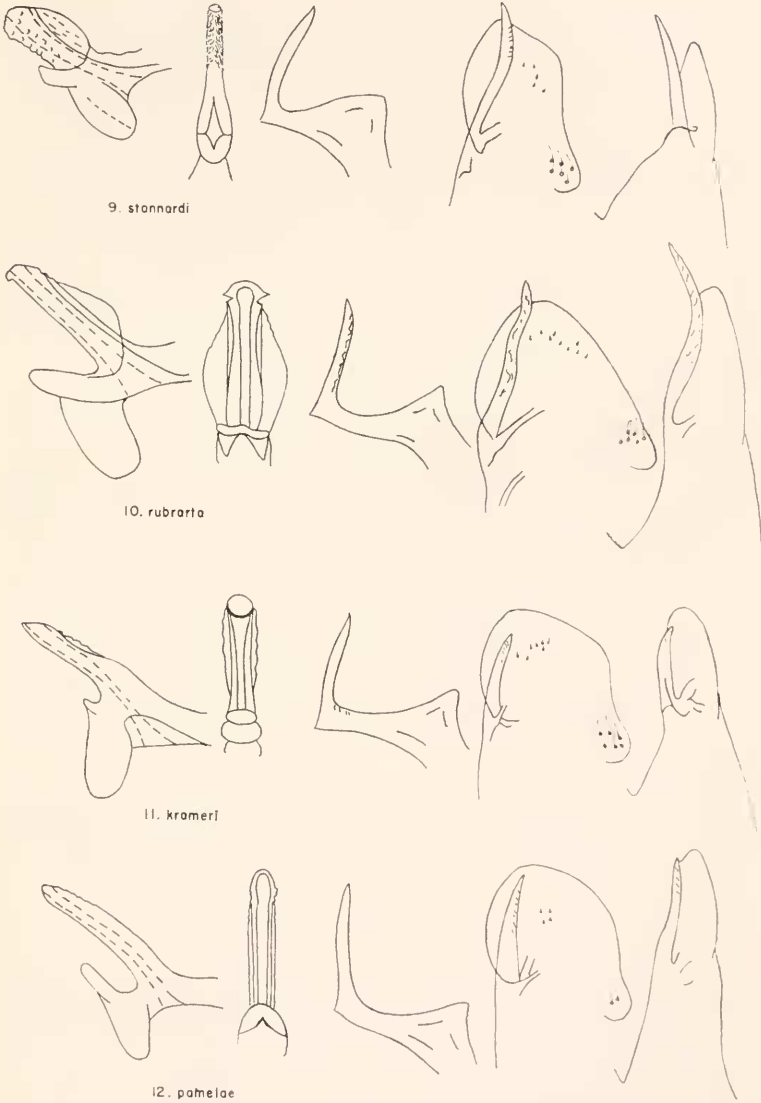
ened dorsal flange, in posterior view broad with narrow lateral flanges, irregularly margined on outer half; dorsal process almost half length of shaft, apodeme subapical. Pygofer hook about length of pygofer, evenly broadened from apex to base, slightly falcate in lateral view and slightly sinuate in dorsal view. Foot of style slender with broad posterior points about length of foot.

Holotype ♂, allotype ♀ and 28 ♂ and 32 ♀ paratypes reared at State College, MISSISSIPPI, in cage 263 on *Quercus falcata* var. *leucophylla*, cherry bark oak, collected on 8 July, 1964 and 4 ♂ and 2 ♀ with same data except collected on 10 June and 4 Aug., 1964, and 20 pairs with same data as above except reared in cage 421 and collected on 15 June, 9 July and 30 July, 1964. Other ♂ paratypes as follows: 1, Norris City, Illinois, 13 April, 1960, Ross and Cunningham; 1, Ava, Illinois, 30 June, 1953, Ross and Moore. *Fagus*; 1, Elizabethtown, Illinois, 2 Sept., 1963, *Q. falcata*; 1, Athens, Arkansas, 28 July, 1963. *Fagus*; 1, Timothy, Tennessee, 1 Sept., 1963, *Fagus*; 1, Etawah, Tennessee, 28 Aug., 1963, *Caryi tomentosa*; 1, Florida Caverns State Park, Florida, 7 Oct., 1960, F. W. Mead.

This species somewhat resembles *penesica* but with longer dorsal process and narrower lateral flanges on shaft of aedeagus. Although cherry bark oak is a definite host, the large number of specimens collected on beech suggests there are either two species involved or the species utilizes both hosts.

### *Erythroneura priniquera* new species (Fig. 13)

Length 3 mm; faintly spotted and with black spot in first apical cell average size. Shaft of aedeagus in lateral view slender and with narrow dorsal flange, in dorsal view with broad lateral flanges from near apex to base; dorsal process about one-third length of shaft. Pygofer hook shorter than pygofer, broad and bladelike in lateral view, narrow in dorsal view. Foot of style long and slender, posterior point straight and slightly shorter than foot.



FIGS. 9-12. *Erythroneura* species indicated, left to right: lateral view of aedeagus, posterior view of aedeagus, foot of style, lateral view of pygofer and pygofer hook and dorsal view of pygofer and pygofer hook. (Aedeagus and foot of style 2× magnification of pygofer and pygofer hook.)

Holotype ♂, allotype ♀ and one pair of paratypes reared at State College, MISSISSIPPI, in cage 63 on *Quercus prinus*, chestnut oak, collected on 8 July, 1962 and 20 ♀ paratypes with same data as above except reared in cage 68 and collected on several dates in 1962. The female parents of the above types were collected near Bruce, Mississippi, from chestnut oak and the specimens were reared from seedlings grown from acorns from the same area.

This species somewhat resembles *arta* but with straight, short pygofer hook and different lateral flanges on shaft of aedeagus.

#### ***Erythroneura natchezensis* new species (Fig. 14)**

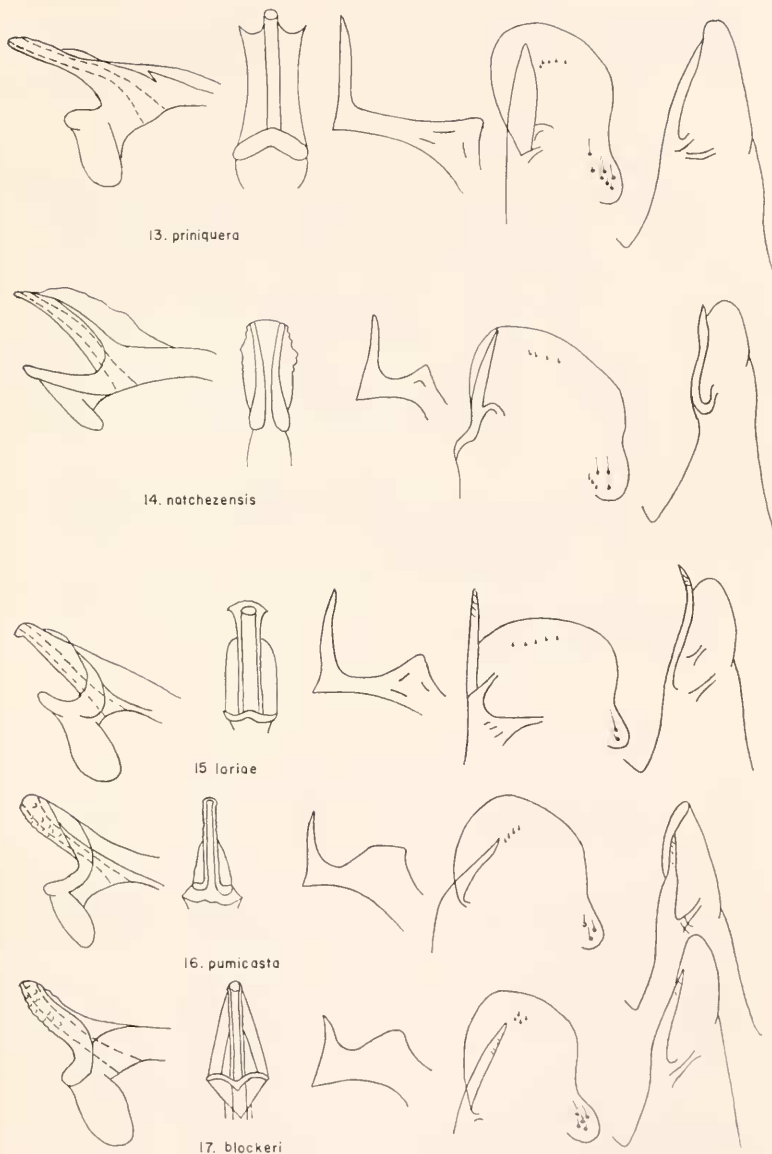
Length 3 mm; wing pattern of connected spots and black spot in first apical cell average size. Shaft of aedeagus in lateral view narrow and with large membranous dorsal flange, in posterior view with large lateral flanges; dorsal process more than half length of shaft. Pygofer hook about length of pygofer, almost straight in both views. Foot of style with toe directed laterally, posterior points longer than foot, sculptured, directed medially so as to meet on the mid line.

Holotype ♂ and one ♂ paratype, Anderson Lake State Park, Fulton Co., ILLINOIS, 8 Sept., 1954, H. B. Cunningham. One other ♂ paratype, Lexington, Tennessee, 4 Sept., 1963, *Corylus americana*.

This species differs from *arta* in having an almost straight pygofer hook, more slender shaft of aedeagus and more extensive dorsal flange.

#### ***Erythroneura loriae* new species (Fig. 15)**

Length 2.6 mm; with an unmarked cream wing color and black spot in first apical cell small. Shaft of aedeagus in lateral view slender with distinct dorsal flange, in posterior view with large lateral flanges; dorsal process about two-fifths length of shaft. Pygofer hook slightly longer than pygofer, almost straight in lateral view, curved in dorsal view. Foot of style slender with posterior point about length of foot, slightly curved.



FIGS. 13-17. *Erythroneura* species indicated, left to right: lateral view of aedeagus, posterior view of aedeagus, foot of style, lateral view of pygofer and pygofer hook and dorsal view of pygofer and pygofer hook. (Aedeagus and foot of style  $2\times$  magnification of pygofer and pygofer hook.)

Holotype ♂, Ratcliff, TEXAS, 21 June, 1962.

This species somewhat resembles *arta* but with straight pygofer hook and smooth lateral flanges.

### **Erythroneura pumicasta** new species (Fig. 16)

Length 2.6 mm; color pattern of indistinct spots and with black spot in first apical cell average size. Shaft of aedeagus in lateral view short with distinct dorsal flange, in posterior view with lateral flanges on basal half; dorsal process about half length of shaft. Pygofer hook short, slightly sinuate and broadened basally in both views. Foot of style short, with large heel, foot directed obliquely laterally, and posterior points obliquely medially; posterior point about three-fourths length of foot.

Holotype ♂, Gainesville, FLORIDA, 6 June, 1963, *Castanea pumila*, chinquapin and one ♂ paratype, Carthage, Mississippi, 25 June, 1962, *Castanea pumila*.

The aedeagus shaft of the specimen from Mississippi is much broader and has a shorter dorsal process, but in other respects it agrees with the holotype.

### **Erythroneura blockeri** new species (Fig. 17)

Length 2.9 mm; color pattern of elongate spots and black spot in first apical cell larger than average. Shaft of aedeagus in lateral view rough, curved, with distinct posterior flange, in posterior view with large lateral flanges from apex to base; dorsal process about two-fifths length of shaft. Pygofer hook shorter than pygofer, almost straight in both views, sculptured on outer half. Foot of style short, heel large, posterior point triangular, directed obliquely mesally.

Holotype ♂, allotype ♀ and three pairs of paratypes reared at State College, MISSISSIPPI, in cage 1496 on *Quercus nigra*, water oak, collected 8 July, 1964, and three pairs with the same data, except collected on 4 Aug., 1964. Additional paratypes reared on *Q. nigra* at State College, Mississippi, as follows: 7 ♂ and 4 ♀ in cage 282 and 4 pairs in cage 1474.

This species somewhat resembles *solita* but without spine like dorsal process and larger lateral flanges and differs from *knnullae* in having a longer dorsal process.

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## Trichoptera from Israel

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Recently a small collection of Trichoptera from Israel was received for identification. Attempting to name these specimens, I immediately became aware of the paucity of caddisfly records from Israel. Herein are presented those few published records which were found, together with the data from the present collection and the description of a new species.

All the records are from the Jordan Valley in the extreme northeast of Israel. Deganya A is near the Jordan River at the outlet from the Sea of Galilee about 209 meters below sea level.